The impact of forest service litigation success on administrative appeals of proposed fuels reduction actions

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Abstract

In this paper, we explore empirically whether the USDA Forest Service's litigation success rate in each Forest Service region helps explain the persistent regional effects noted by Laband et al. (Laband, D.N., González-Cabán, A., and Hussain, A. (2006). "Factors That Influence Administrative Appeals of Proposed USDA Forest Service Fuels Reduction Actions," Forest Science, 52(5): 477–488.) with respect to the pattern of administrative appeals of proposed fuels reduction actions. We find strong evidence of an inverse relationship between the Forest Service's litigation success rate and the likelihood of administrative appeal of proposed fuels reduction actions on public lands. However, inclusion of this variable explains only about 20% of the region-specific impact noted in Laband et al. (Laband, D.N., González-Cabán, A., and Hussain, A. (2006). "Factors That Influence Administrative Appeals of Proposed USDA Forest Service Fuels Reduction Actions," Forest Science, 52(5): 477–488.), which continues to command additional investigation.
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1. Introduction

Using data compiled by the General Accounting Office, Laband et al. (2006) identified factors that influenced administrative appeals of proposed USDA Forest Service fuels reduction actions on federal lands during 2001 and 2002. One of their puzzling findings was that even controlling for a large number of potential explanatory variables, there were persistent regional effects, with USDA Forest Service Regions 1, 3, 6 and 8 behaving statistically significantly different than the omitted control region (regions 2, 4, 5, 9 and 10 treated as a single region).[1] Specifically, fuels reduction proposals in Region 1 were characterized by a significantly higher likelihood of administrative appeal, while proposals in Regions 3, 6 and 8 had a lower likelihood of being appealed.

In this paper, we provide a partial explanation for this result. An economic theory of legal confrontation predicts that one party will formally confront (sue) another party when the expected benefits outweigh the expected costs. All other things equal, in regions where expected net benefits from suing are lower (higher), there will be less (more) litigation.[2] Since administrative appeal of proposed Forest Service fuels reduction actions is a *sine qua non* to attain legal standing to sue to block proposed actions, regions that are predicted to have smaller expected net benefits from suing also should be characterized by fewer administrative appeals. We empiricize this relationship by adding the Forest Service's litigation success rate as an explanatory variable in the

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[1] USDA Forest Service Regions include: Northern Region (R1); Rocky Mountain Region (R2); Southwestern Region (R3); Intermountain Region (R4); Pacific Southwest Region (R5); Pacific Northwest Region (R6); Southern Region (R8); Eastern Region (R9); Alaska (R10).

[2] This economic theory of legal confrontation does not preclude there being a broad spectrum of underlying motivations to sue, including the desire to gain publicity, delay implementation of proposed Forest Service actions, and so on. These motivations generate expected benefits for the litigant(s).

Laband et al. (2006) model. We find strong evidence of an inverse relationship between the Forest Service's litigation success rate and the likelihood of administrative appeal of proposed fuels reduction actions on public lands. However, inclusion of this variable explains only about 20% of the region-specific impact noted in Laband et al. (2006), which continues to command additional investigation.

We begin by developing a simple model of strategic interaction between rivals (the Forest Service and non-governmental organizations) interested in land-use management outcomes to derive predictions about how the behavior of the Forest Service influences the behavior of NGOs.[3] Then we introduce our empirical model and data, followed by presentation of our estimation results. A brief discussion concludes the paper.

2. A simple model of strategic interaction between the Forest Service and NGOs

We postulate that the goal of both agents (USDA-Forest Service and NGOs) is to reduce the probability and/or severity of forest fires by implementing socially responsible fuels reduction strategies. There are, however, divergences between the agents with respect to their independently-developed perceptions of the costs imposed on the environment by a given fuels reduction proposal and how this cost can be minimized. These divergences in perceptions lead to adoption of differing objectives. Specifically, USDA Forest Service personnel strive to maximize the proposed project implementation rate in order to reduce fuel loads, whereas NGOs try to minimize the proposal project implementation rate.[4] Except for the proposals protected under NEPA, all proposals, thus, become contentious. The adjudicating agent rules in favor of the Forest Service or the appellant NGO depending on his/her understanding of the costs imposed by the specific fuel reduction action proposed.

We represent this strategic interaction between the Forest Service and NGOs as a system of 3 nested equations:[5]

$$\text{Likelihood of Appeal}_{ij} = f_1(ESR_{ij}, PC_{ij}),\tag{1}$$

where ESR_{ij} refers to the NGO's expectation that the Forest Service will successfully fend off an NGO-filed litigation challenge to proposed fuel reduction proposal i in region j, and PC_{ij} is the NGO's perceived costs associated with fuel reduction proposal i in region j;

$$ESR_{ij} = f_2(SR_j \text{ Packaging}_{ij}\{FRM, FRI, FRP, ACT, ACRES\},$$
$$\text{NGO Education Effort}_{ij}\{PC_{ij}\}),\tag{2}$$

where SR_j refers to the Forest Service's historical litigation success rate in region j, independent of proposal i, Packaging refers to how proposal i is presented by the Forest Service, FRM refers to proposed fuels reduction methods (e.g., prescribed burning, mechanical thinning, etc), FRI refers to fuel reduction implementation mechanism (e.g., forest service personnel, service contract, etc), FRP refers to fuel reduction purpose (e.g., saw log production, livestock forage, etc), ACT reflects the number of fuels reduction activities included in the proposal for site i, and ACRES refers to the numbers of acres affected by the proposed fuel reduction action, NGO Education Effort refers to the activities of the NGO to educate the public (including the adjudicating official) about the perceived costs, from the NGO's perspective, of the Forest Service's proposed fuel reduction action.

With respect to the SR_j our assumption is that E-NGOs and other prospective appellants invest optimally in information acquisition efforts to form efficient expectations about litigation outcomes. That is, rational appellants surely keep a very close watch on the outcomes of lawsuits filed against the Forest Service in regions they are concerned about and have developed a quite informed understanding of how judges treat the Forest Service.

The educational effort by the NGO is a positive function of the perceived costs they associate with the proposed fuel reduction action;

$$PC_{ij} = f_3(ECO_{ij}, \text{Packaging}_{ij}\{FRM, FRI, FRP, ACT, ACRES\},$$
$$LIMP_{ij}\{SR_j\})\tag{3}$$

where ECO_{ij} refers to location-specific ecological and environmental factors (such as proximity to a wildland-urban interface or inventoried roadless area) that may influence perceived costs and benefits of proposed Forest Service actions, and $LIMP_{ij}$ refers to the likelihood of implementation of proposed fuels reduction proposal i in region j, which is affected by the Forest Service's historical litigation success rate in that region.

Substituting Eq. (3) into both Eqs. (2) and (1) and then Eq. (2) into Eq. (1) yields the reduced-form model:

$$\text{Likelihood of Appeal}_{ij}$$
$$= F(FRM, FRI, FRP, ACT, ACRES, SR_j, ECO_{ij}).\tag{4}$$

3. Data and methods

Our data were obtained from the U.S. General Accounting Office (2003), which collected detailed data for 2001 and 2002 regarding proposed fuel reduction actions on federal lands. Of the 818 decisions made during this time period, 336 were subject

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[3] Cortner et al. (2003) note that appeals of forest plans and projects are filed by a wide variety of appellants including environmental groups, individual citizens, industries, and recreation and other user groups. But given that these appellants have a shared concern with respect to ensuring socially responsible forest management, they may be treated as members of a single interest group—the NGO—without loss of generality.

[4] We acknowledge that our treatment reflects a simplified perspective of a perhaps considerably more complex reality in which, for example, the parties are concerned about the amount of acreage involved, the speed of implementation, and so on. Because our analysis focuses strictly on the likelihood of administrative appeal, this simplified treatment is appropriate. However, an analysis that is concerned more broadly with these other aspects of implementation would command a more complex model of strategic interaction between the parties.

[5] See Mortimer et al. (2004) for a closely related analytical framework regarding national forest appeals, where ecology, economics, institutions, society, and ethics contribute to forming a linkage between the perceived abuse of national forest management practices and the pursuit of appeals as a policy fix. There is, however, a key distinction between our presentation and theirs: while Mortimer et al. do not expound explicitly on the direction of causation, it is central to our analysis.

Table 1
Explanatory variables in the PROBIT Model

Variable name	Explanation/definition
Region1–6, 8–10	0–1 dummy variables indicating whether (1) or not (0) the proposed fuels reduction action was located in a specific U.S. Forest Service region
USFS litigation success rate	The fraction of litigated land management cases filed during the period 1989–2002 that the USFS 'won'; each observation was assigned the value reported for the relevant Forest Service region by Keele et al. (2006)
Total activities	The total number of activities indicated for each fuels reduction proposal, mean: 6.57, s.d.: 4.77
Total acreage	The total number of hectares indicated for each fuels reduction proposal, mean: 2116.45, s.d.: 5907.16
Inventoried roadless area	Assigned a value of 1 if the proposed fuels reduction action took place, in part, on an inventoried roadless area; 0 otherwise, mean: 0.12, s.d.: 0.32
Wildland urban interface area	Assigned a value of 1 if the proposed fuels reduction action took place, in part, in a wildland/urban interface area; 0 otherwise, mean: 0.46, s.d.: 0.50
Implementation mechanism	
Forest service personnel	Assigned a value of 1 if implementation of the proposed fuels reduction was accomplished, in part, by using USFS personnel; 0 otherwise, mean: 0.79, s.d.: 0.41
Service contract	Assigned a value of 1 if implementation of the proposed fuels reduction was accomplished, in part, by a service contract; 0 otherwise, mean: 0.60, s.d.: 0.49
Stewardship contract	Assigned a value of 1 if implementation of the proposed fuels reduction was accomplished, in part, by using a stewardship contract; 0 otherwise, mean: 0.09, s.d.: 0.29
Other implementation mechanism	Assigned a value of 1 if implementation of the proposed fuels reduction was accomplished, in part, by another mechanism; 0 otherwise. According to the GAO (2003) these other implementation mechanisms included use of Forest Service personnel, contracts for prison labor, and collaborative efforts with the Bureau of Land Management, mean: 0.10, s.d.: 0.30
Implementation method	
Prescribed burning	Assigned a value of 1 if implementation of the proposed fuels reduction involved prescribed burning; 0 otherwise, mean: 0.77, s.d.: 0.42
Mechanical thinning	Assigned a value of 1 if implementation of the proposed fuels reduction involved mechanical thinning; 0 otherwise, mean: 0.79, s.d.: 0.40
Other thinning mechanism	Assigned a value of 1 if implementation of the proposed fuels reduction involved some other thinning mechanism; 0 otherwise, mean: 0.28, s.d.: 0.45
Stated purpose	
Commodity production—other	Assigned a value of 1 if the proposed fuels reduction action had as a purpose commodity production—other; 0 otherwise, mean: 0.12, s.d.: 0.33
Timber/sawlog production	Assigned a value of 1 if the proposed fuels reduction action had as a purpose commodity production—timber and sawlogs; 0 otherwise, mean: 0.51, s.d.: 0.50
Fuels reduction—natural fuels	Assigned a value of 1 if the proposed fuels reduction action had as a purpose fuels reduction—natural fuels; 0 otherwise mean: 0.85, s.d.: 0.36
Fuels reduction—activity fuels	Assigned a value of 1 if the proposed fuels reduction action had as a purpose fuels reduction—activity fuels; 0 otherwise, mean: 0.41, s.d.: 0.49
Habitat enhancement	Assigned a value of 1 if the proposed fuels reduction action had as a purpose enhancement of wildlife habitat; 0 otherwise, mean: 0.71, s.d.: 0.45
Domestic livestock forage	Assigned a value of 1 if the proposed fuels reduction action had as a purpose enhancement of livestock grazing; 0 otherwise, mean: 0.04, s.d.: 0.19
Stand growth/management	Assigned a value of 1 if the proposed fuels reduction action had as a purpose stand growth and management; 0 othewise mean: 0.43, s.d.: 0.50
Other purpose	Assigned a value of 1 if the proposed fuels reduction action had as a stated purpose 'other'; 0 otherwise, mean: 0.34, s.d.: 0.47

to administrative appeal, based on NEPA filing requirements. The other 482 decisions were categorical exclusions from the NEPA filing requirement, and thus were not appealable. Of the full GAO survey sample of 818 observations, several were deleted because of incomplete or unusable responses. This left us with a usable sample of 792 observations, of which 336 were appealable. Of the proposals subject to appeal, 194 (58%) of these were in fact appealed. These data were augmented by information specific to each of the USDA Forest Service regions regarding the Forest Service's litigation success rate, based on the Keele et al. (2006) analysis of "...all federal court cases filed from January 1, 1989, to December 31, 2002, in which the U.S. Forest Service was a defendant in a lawsuit challenging a land

management decision." Table 1 identifies the specific explanatory variables included in our estimated models and provides information with respect to means and standard deviations.[6]

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[6] Since it frequently was the case that multiple activities were proposed for implementation at a given location, the mean values for the proportions of the various implementation mechanisms and purposes sum to greater than one. This means that the categories are not mutually exclusive. For example, there were 12 response possibilities for the question, "What are the method(s) of fuels reduction for the fuels reduction activity or activities that make up this decision?" Included among the response possibilities are 3 types of prescribed burning, 5 types of mechanical treatment, construction/maintenance of fuel breaks, chemical/herbicide treatment, livestock grazing, and 'other.' The proposed fuels reduction activity at many sites was characterized by some combination of both prescribed burning and mechanical thinning.

Table 2
Probit regression estimation results—*Dep. Var. = Decision was appealed*

	(a)			(b)		
	Coefficient estimate	Standard error	Marginal effect	Coefficient estimate	Standard error	Marginal effect
Intercept	−2.22***	0.46		1.52	1.68	
USFS litigation success rate				−4.56*	2.19	−1.79
Region 1	0.90***	0.28	0.31			
Region 3	−0.71**	0.35	−0.27			
Region 6	−0.47**	0.22	−0.18			
Region 8	−0.56*	0.38	−0.22			
Total Activities	0.04 **	0.02	0.02	0.04*	0.02	0.02
Total Acreage (LN)	0.23***	0.06	0.09	0.18***	0.05	0.07
Inventoried roadless area	0.19	0.26	0.07	0.44*	0.25	0.17
Wildland Urban interface area	−0.26†	0.17	−0.10	−0.25†	0.17	−0.10
Forest Service personnel	−0.38*	0.26	−0.15	−0.46*	0.25	−0.18
Service contract	−0.42**	0.21	−0.16–0.37*	0.20		−0.14
Stewardship contract	−0.16	0.29	−0.06	−0.03	0.30	−0.01
Prescribed burning	0.48**	0.24	0.19	0.51**	0.24	0.20
Mechanical Thinning	0.56**	0.28	0.22	0.35	0.25	0.14
Timber/sawlog production	0.33*	0.20	0.13	0.56***	0.19	0.22
Commodity production—other	−0.12	0.27	−0.05	−0.24	0.25	−0.09
Fuels reduction—natural fuels	−0.18	0.24	−0.07	−0.16	0.23	−0.06
Fuels reduction—activity fuels	0.54***	0.19	0.21	0.57***	0.19	0.22
Habitat enhancement	0.14	0.21	0.05	0.12	0.21	0.05
Domestic livestock forage	−0.38	0.47	−0.15	−0.67*	0.40	−0.26
Stand growth/management	−0.05	0.20	−0.02	−0.13	0.20	−0.05
Other purpose	0.31*	0.18	0.12	0.37**	0.17	0.14
Observations	336			336		
Wald χ^2	91.09 (N=21)			77.84 (N=18)		
Pseudo R^2	0.278			0.235		
Bayesian information criterion	−6.226			−3.707		

***, ** and * respectively indicate significance at 1%, 5%, and 10%; † indicates significance at 15%.

Following Laband et al. (2006) we employed a maximum likelihood (Probit regression) procedure to estimate the reduced-form model presented in Eq. (4). This estimation technique is appropriate in consideration of the limited range of values (0 or 1) assigned to the dependent variable (Greene 2003).

4. Estimation results

In column (a) of Table 2, we report the heteroscedasticity-corrected estimation results for a model that contains the statistically significant regional dummy variables with the other regions collapsed into a single control category (this is our reproduced result from Laband et al. (2006)), whereas the model in column (b) includes the region-specific Forest Service litigation success rate but no regional dummy variables.[7] The two models exhibit a great deal of consistency with respect to both the size of the estimated effects of the explanatory variables and their statistical significance. Based on the Bayesian information criterion (BIC), there is only weak evidence that

the model presented in columns (a) might be a better fit for the data.[8]

Essentially, all of the findings reported in Laband et al. (2006) are preserved: the likelihood of administrative appeal of a proposed fuels reduction action increases with the number of site-specific activities and the acreage involved, if implementation involves prescribed burning, if the stated purpose includes timber/sawlog production, and if the purpose includes activity-generated fuels reduction. However, the likelihood of administrative appeal is reduced if it is implemented by Forest Service personnel and/or by service contract. In addition, we have established that, as predicted, there is an inverse relationship between the Forest Service's region-specific litigation success rate and the likelihood of administrative appeal of proposed fuels reduction actions on public lands.

5. Discussion

We readily concede that our formal model reflects a simplistic view of the relationship between environmental

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[7] Consistent with our hypothesis that the two models are equally better representation of the data, i.e., non-nested competing models, we did not simultaneously enter both the Forest Service's litigation success rate and regional dummies into a single model. On technical grounds as well, this would have been difficult to do so without it then being characterized by severe multi-collinearity.

[8] Note that the use of pseudo-R^2 would be inappropriate here as it can only be used to compare nested models. According to BIC, the model with larger negative BIC is considered a better fit to the data. To compare two non-nested models based on BIC, Raftery (1995) provides the following a rule of thumb: an absolute difference in the range of 0–2 would be consistent with a weak support for the model with larger negative BIC; 2–6 would be considered positive, 6–10 as strong and >10 as very strong.

NGOs and the Forest Service as well as a simplistic view of the motives of the appellants. However, no matter how complex one might care to specify either the motives of, or the interaction between, the various parties, our model captures a critical feature: disagreement regarding implementation of fuels reduction policy. Regardless of the wellspring of any such disagreement, the facts are rather indisputable: in the aggregate, during the period of time covered by our data administrative appeals were filed on over half of the proposed fuels reduction actions and there was considerable variation across Forest Service regions with respect to the incidence of administrative appeals. Our motivation for this paper was to identify, if possible, factors that contribute to the regional variation in the incidence of administrative appeals. By assuming rationality on the part of prospective appellants (i.e., E-NGOs optimally invest in information, and that they will formally confront [sue] the Forest Service when the expected benefits outweigh the expected costs), we predicted that these regional differences might, in part, reflect differences in the litigation success rate of the Forest Service. That is, in regions where the Forest Service has a relatively high success rate with respect to appeals litigation, there will be fewer appeals to begin with, and vice-versa. Our empirical analysis verified that this indeed is the case.

Rational appellants surely invest resources to acquire relevant information that helps them develop realistic assessments of the likelihood of successful litigation in the event administrative appeals fail (from their perspective). This assumption is not only relevant to the specific context we address, but also to decision-making generally (Stigler, 1961). Indeed, the discussion in Floyd (2004) supports this claim, as he argued (p. 9) that structural changes facilitated the "emergence of a well-educated and highly motivated citizenry that has the energy, time and money to engage the judicial system as a tool to influence agency decisions."

Operationally, the availability of such information may be problematic. However, this is not a problem in our specific context because litigation information is, in fact, available, although not completely in published form. As Keele et al. (2006) demonstrate by their own successful efforts to acquire it, unpublished information about Forest Service litigation is available to "well-educated and highly motivated" citizens with "energy, money and time to engage." As Keele et al. did, private citizens can request (under FOI law, if necessary) a list of cases known by the national litigation coordinator in the Forest Service's Ecosystem Management Coordination office. Likewise, the electronic databases they consulted are available to private citizens. Thus, the findings in this research are consistent with appellants being aware of litigation success rates within each of the Forest Service regions.

We believe that our finding is important for at least two reasons. First, there is clear evidence of rationality on the part of prospective appellants, in the sense that expected benefits and costs influence the filing of administrative appeals; this understanding should inform future research that seeks to explain the behavior of prospective appellants. Second, prospective appellants apparently are well-informed about the

Forest Service's litigation success rate. If they were not well-informed, there would be no reason to expect (or observe) such a strong relationship between the likelihood of administrative appeals and the Forest Service's litigation success rate. Again, this understanding should inform future research that seeks to explain the behavior of prospective appellants.

6. Conclusion

Although we have demonstrated that the significant regional effects on administrative appeals that we reported in Laband et al. (2006) can be explained, in part, by region-specific Forest Service litigation success rates, there remains considerable regional impact that is not explained by this variable. We suggest two plausible explanations: (1) because the mere filing of an administrative appeal may accomplish an important purpose, delay in the implementation process, at little out-of-pocket cost to the appellant and regardless of the final adjudication, part of the unexplained regional variation in the incidence of administrative appeals may reflect regional differences in the filing of appeals as a delaying strategy, and (2) likewise, the filing of administrative appeals may bring publicity that affects membership and/or funding for the appellant organization. To the extent that these sorts of policy-unrelated motives are distributed among prospective appellants unequally across Forest Service regions, the pattern of administrative appeals also will be distributed unequally across Forest Service regions.

There may, of course, be other explanations of the regional pattern of administrative appeals of proposed Forest Service fuels reduction actions. We have contributed to our knowledge of this pattern, but still seek a more comprehensive understanding. So we conclude this analysis in much the same manner as we concluded our previous one, by inviting other researchers to develop explanations for the strong regional impacts on administrative appeals.

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